

Appln. No. 10/802,139
Amendment dated October 17, 2005
Reply to Office Action of June 17, 2005

REMARKS/ARGUMENTS

Reconsideration of the present application, as amended, is respectfully requested.

The June 17, 2005 Office Action and the Examiner's comments have been carefully considered. In response, claims are amended and added, and remarks are set forth below in a sincere effort to place the present application in form for allowance. The amendments are supported by the application as originally filed. Therefore, no new matter is added.

CLAIM REJECTIONS

In the Office Action claims 1-6 are rejected under 35 USC 103(a) as being unpatentable over USP 6,069,934 (Verman et al.) in view of USP 6,014,423 (Gutman et al.) and U.S. Patent Publication 2003/0068010 (Lentfer).

The present claimed invention as defined by independent claim 1 is directed to an X-ray diffraction apparatus which includes an incident optical system (22), a sample support mechanism (24), a receiving optical system (26), and receiving-optical-system rotating means (30). An X-ray emitted from the incident optical system (22) is incident on a sample (60) supported by the sample support mechanism (24), and an X-ray diffracted by the sample (60) is detected by the receiving

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optical system (26). The receiving-optical-system rotating means (30) has a function to allow the receiving optical system (26) to turn around a first axis of rotation (32) for changing an angle (2θ) defined by the direction of the X-ray incident on the sample (60) and the optical axis of the receiving optical system (26). The incident optical system (22) includes an X-ray source (66) and a multilayer-film mirror (76) which has a function to collimate an X-ray emitted from the X-ray source (66) within a plane perpendicular to the first axis of rotation (32). The sample support mechanism (24) includes attitude controlling means (36, 40) which has a function to switch the condition of the sample support mechanism (24) from a state maintaining the sample (60) to have a first attitude so that a normal line (61) of the surface of the sample (60) is substantially perpendicular to the first axis of rotation (32). The sample support mechanism (24) also includes first incident-angle controlling means (36, 40) which has a function to rotate the sample (60) around a second axis of rotation (37) that is substantially perpendicular to the first axis of rotation (32) for changing an incident angle (α) which an X-ray emitted from the incident optical system (22) is incident on the surface of the sample (60) that is in the first attitude. The sample support mechanism (24) further includes second incident-angle controlling means (34) which has a function

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to rotate the sample (60) around the first axis of rotation (32) for changing the incident angle (α) when an X-ray emitted from the incident optical system (22) is incident on the surface of the sample (60) that is in the second attitude. The sample support mechanism also includes a mechanism for rotating the sample (Ru and Rv rotations) about two axes of rotation which are orthogonal to each other and pass on the surface of the sample.

Claim 1 has been amended to recite that the sample support mechanism includes a mechanism for rotating the sample around two axes of rotation which are orthogonal to each other and pass on the surface of the sample. This limitation was cancelled from original claim 6 and incorporated into amended claim 1.

In rejecting claim 6, the Examiner states that Lentfer teaches an apparatus wherein the sample support mechanism includes a mechanism for moving the sample in a direction perpendicular to the surface of the sample (10_y), a mechanism for translating the sample two-dimensional direction within a plane parallel with the surface of the sample (10_x), a mechanism (20) for rotating the sample around two axes (y_p and x_p) of rotation which are orthogonal to each other and pass on the surface of the sample and a mechanism (at 20 [Phi]) for an in-dash plane rotation (about axis z_p) of the sample. See item #9 on page 6 of the Office Action.

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The Ru- and Rv-rotations allow a normal line 61 of the sample surface to coincide with the axis of rotation 45 of the sample turntable 42 to prevent the sample surface from exhibiting undulation during the ϕ rotation in the in-plane diffraction measurement (see page 25, lines 10 through 20 of the specification). The Ru- and Rv-rotations are not disclosed in Lentfer. Although the Examiner mentions that Lentfer teaches the two rotations around two axes (y_p and x_p), such rotations are not shown in the reference. There is no rotational mechanism disclosed, taught or suggested in Lentfer other than the mechanism (20) for the conventional three rotations (ω , x , ϕ).

That is, Lentfer only teaches that the rotation mechanism 20 tilts the sample about tilting axles (see Lentfer at paragraphs 0041 and 0042). There is no disclosure, teaching or suggestion of a mechanism for rotating the sample around two axes of rotation which are orthogonal to each other and pass on the surface of the sample. None of the other references of record close the gap between the present claimed invention as defined by amended claim 1 and the applied references.

That is, amended claim 1 is patentable over all of the references of record under 35 USC 102 as well as 35 USC 103 because the references do not disclose, teach or suggest an X-ray diffraction apparatus wherein the sample support mechanism

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includes a mechanism for rotating the sample around two axes of rotation which are orthogonal to each other and pass on the surface of the sample (see claim 1, lines 40-42).

Claims 2-6 are dependent on claim 1 and are patentable over the cited references in view of their dependence on claim 1 and because the references do not disclose, teach or suggest each of the limitations set forth in claims 2-6.

In view of all of the foregoing, claims 1-6 are in form for immediate allowance, which action is earnestly solicited.

NEW CLAIM

New claim 7 is added to the present application. New claim 7 recites that the attitude controlling means recited in claim 1 includes a curved guide having a circular arc internal surface and an attitude-change table movable along the internal surface of the curved guide, the curved guide having one end which is located at a position higher than the sample, and another end which is located at a position lower than the sample, and a through-hole through which the X-ray can pass is formed in a vicinity of the one end of the curved guide.

The limitations set forth in new claim 7 are not disclosed in the cited references. The full-circular rotation mechanism 20w of Lentfer may interrupt the X-ray in the in-plane

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diffraction measurement. In contrast, the semi-circular curved guide 36 in the present invention does not interrupt the X-ray during the in-plane diffraction measurement because it has the through-hole 63 at one end 62 located higher than the sample 60 and the other end 64 which is located lower than the sample 60.

The present claimed invention as defined by claim 7 is patentable over the cited references in view of its dependence on claim 1 and because the references do not disclose, teach or suggest each of the limitations set forth in claim 7. Moreover, claim 7.

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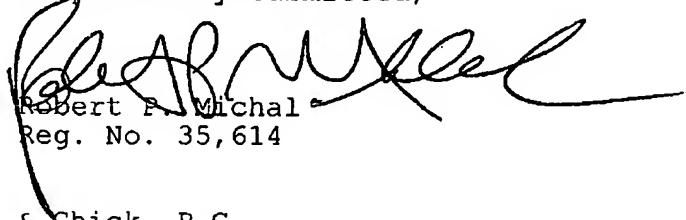
Entry of this Amendment, allowance of the claims and the passing of this application to issue are respectfully solicited.

If the Examiner disagrees with any of the foregoing, the Examiner is respectfully requested to point out where there is support for a contrary view.

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If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,


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Encl.: Petition for Extension of Time